DETAILED ACTION

Response to Amendment

The amendment filed on 3/15/2010 has been entered.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 1/26/2004. It is noted, however, that applicant has not filed a certified copy of the 2004-016699 application as required by 35 U.S.C. 119(b).

Response to Arguments

Applicant's arguments (prior art rejections under 35 USC 103) with respect to the amendment claims 1-41 have been considered but are moot in view of the new ground(s) of rejection.

Claim 17 was rejected under 35 USC 112; however, the applicant merely stated the rejection and did not respond to the rejection. Thus, the examiner maintains the rejection.

Regarding the applicant's argument with respect to priority, the examiner respectfully agrees that the applicant filed PCT/JP2005//000972; however, a certified copy of the 2004-016699 application was not filed. Thus, the examiner maintains the objection made.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17, 22, and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites the limitation “a refractive index”. It is unclear of which part “a refractive index” is referred to.

Claim 22 recites the limitation "phosphors". There is insufficient antecedent basis for this limitation in the claim.

Claim 37 recites the limitation “approximately same material”. It is unclear what kind of material constitutes approximately same material.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-3, 5, 10, 15, 16, 18, 19, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Okumura (US 5,811,924).

Regarding claim 1, Okumura discloses a wavelength converter (figures 3 and 4) having two layers of conversion layers including a first wavelength conversion layer containing phosphors comprising ultrafine particles having a mean particle size less than 200 nm (column 7, lines 9-12), and a second wavelength conversion layer containing phosphors comprising a fluorescent substance having a mean particle more than 1 micron (column 8, lines 49-51).

Regarding claim 2, Okumura discloses the phosphors are dispersed in a resin (column 10, lines 13-40).

Regarding claim 3, Okumura discloses the ultrafine particles are a semiconductor composition (column 8, lines 30-41).

Regarding claim 5, Okumura discloses the resin matrix is a substantially a single resin layer (figures 3 and 4).

Regarding claim 10, Okumura discloses the ultrafine particles have a mean particle sizes of 0.5 to 20 nm (column 7, lines 9-12).

Regarding claim 15, Okumura discloses the ultrafine particles have light luminescence capability (column 7, lines 31-46).

Regarding claim 16, the examiner notes that the claim limitation of the resin matrix being obtained by hardening a liquid unhardened material of a mixture of the semiconductor ultrafine particles and the fluorescent substance is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (MPEP 2113).

Regarding claims 18 and 19, the examiner notes that the claim limitation of the resin matrix being hardened by heat energy or light energy is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (MPEP 2113).

Regarding claim 21, Okumura discloses the converter generates fluorescence having at least two or more intensity peaks in the range of wavelengths of visible light (column 9, lines 33-38; and column 10, lines 41-54).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura.

Regarding claim 4, Okumura does not specifically disclose the band gap energy of the semiconductor ultrafine particles is 1.5 to 2.5 eV. However, one of ordinary skill in the art would have been led to the recited ranges through routine experimentation and optimization. Applicant has not disclosed that the ranges are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another ranges. Indeed, it has been held that mere ranges limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical.

Regarding 17, Okumura does not specifically disclose a refractive index of the resin matrix is not less than 1.7. However, it is widely known in the art to reduce the refractive index of the resin matrix thereby enhancing light emissivity.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a refractive index of the resin matrix is not less than 1.7 in the device disclosed by Okumura, for the purpose of enhancing light emissivity.

Also, one of ordinary skill in the art would have been led to the recited ranges through routine experimentation and optimization. Applicant has not disclosed that the ranges are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that

the process would possess utility using another ranges. Indeed, it has been held that mere ranges limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical.

Regarding claim 20, Okumura does not specifically disclose the resin matrix comprises polymer resin containing silicon-oxygen bonds in a main chain.

However, it is widely known in the art to use polymer resin containing silicon-oxygen bonds in a main chain for resin matrix due to its availability.

Also, one of ordinary skill in the art would have been led to form the resin matrix containing silicon-oxygen bonds in a main chain as a matter of choice. Applicant has not disclosed that the configuration is for a particular unobvious purpose, produce an unexpected/significant result, or are otherwise critical, and it appears prima facie that the process would possess utility using another configuration.

Claims 6, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura in view of Thurk (US 2004/0245912).

Regarding claim 6, Okumura does not specifically disclose the surface of the particles is coated with surface modifying molecules.

Thurk discloses wavelength converter (figure 7, 78) having the semiconductor ultrafine particles have surfaces coated with surface modifying molecules (paragraph 32, the examiner interprets particles as cores and surface modifying molecules as shells), for the purpose of protecting the particles inside the shell thereby enhancing the efficiency of light emission.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the surface of the particles is coated with surface modifying molecules as disclosed by

Thurk in the device disclosed by Okumura, for the purpose of protecting the particles inside the shell thereby enhancing the efficiency of light emission.

Regarding claim 11, Thurk discloses a wavelength converter (figure 7, 78) having the semiconductor ultrafine particles have core-shell structure (paragraph 32). The reason for combining is same as claim 6.

Regarding claim 15, Thurk discloses the semiconductor ultrafine particles have light luminescence capability (paragraph 32).

. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura in view of Thurk, in further view of Tanaka (US 2004/0067849).

Regarding claim 7, Okumura in view of Thurk does not specifically disclose the surface modifying molecules have two or more silicon oxygen bonds repeated.

Tanaka discloses a light emitting device (paragraph 3) including bonding ultrafine particles with silicon oxygen bonds (paragraph 132), for the purpose of increasing bonds between the ultrafine particles thereby dispersing the particles in homogenous manner.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have bonding ultrafine particles with silicon oxygen bonds as disclosed by Tanaka in the device disclosed by Okumura in view of Thurk, for the purpose of increasing bonds between the ultrafine particles thereby dispersing the particles in homogenous manner.

Regarding claim 8, Tanaka discloses the surface modifying molecules form coordinate bonds to the surface of the particles (paragraph 132). The reason for combining is same as claim 7.

Regarding claim 9, Okumura in view of Thurk and Tanaka does not specifically disclose the number of silicon-oxygen repeating units of each of the surface modifying molecules is 5 to 500.

However, one of ordinary skill in the art would have been led to the recited ranges through routine experimentation and optimization. Applicant has not disclosed that the ranges are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another ranges. Indeed, it has been held that mere ranges limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical.

Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okumura in view of Thurk, in further view of Manabu (JP 2002-121548) which is cited in the IDS.

Regarding claim 12, Okumura in view of Thurk does not specifically disclose each of the surface-modifying molecules has at least one functional group selected from the group consisting of an amino group, a mercapto group, a carboxyl group, an amide group, an ester group, a carbonyl group, a phosphoxide group, a sulfoxide group, a phosphone group, an imine group, a vinyl group, a hydroxy group and an ether group.

Manabu discloses a wavelength converter (paragraph 1) including the surface-modifying molecules has at least one functional group selected from the group consisting of an amino group, a mercapto group, a carboxyl group, an amide group, an ester group, a carbonyl group, a phosphoxide group, a sulfoxide group, a phosphone group, an imine group, a vinyl group, a hydroxy group and an ether group (paragraph 19), for the purpose of enhancing mechanical strength and chemical stability of the particles.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the surface-modifying molecules has at least one functional group selected from the group consisting of an amino group, a mercapto group, a carboxyl group, an amide group, an ester group, a carbonyl group, a phosphoxide group, a sulfoxide group, a phosphone group, an imine group, a vinyl

group, a hydroxy group and an ether group as disclosed by Manabu in the device disclosed by Okumura in view of Thurk, for the purpose of enhancing mechanical strength and chemical stability of the particles.

Regarding claim 13, Manabu discloses each of the surface-modifying molecules is provided with two or more side chains having the functional group (paragraph 19). The reason for combining is same as claim 12.

Regarding claim 14, Manabu discloses a side chain is at least one selected from the group consisting of a methyl group, an ethyl group, a n-propyl group, an iso-propyl group, a n-butyl group, an iso-butyl group, a n-pentyl group, an iso-pentyl group, a n-hexyl group, an iso-hexyl group, a cyclohexyl group, a methoxy group, an ethoxy group, a n-propoxy group, an iso-propoxy group, a n-butoxy group, an iso-butoxy group, a n-pentoxy group, an iso-pentoxy group, a n-hexyloxy group, an iso-hexyloxy group and a cyclohexyloxy group (paragraph 19). The reason for combining is same as claim 12.

Claims 22-39 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cho (US 2004/0217692) in view of Okumura.

Regarding claim 22, Cho discloses a light-emitting device (figures 5A and 5B) comprising a light-emitting element (110) that is provided on a substrate (105) and emits excitation light, and a wavelength converter (120) that is positioned on an anterior surface of the light-emitting element and converts the excitation light into visible light wherein the visible light is output light ("white light"), wherein the wavelength converter (figures 5A and 5B), comprising a plurality of wavelength conversion layers (120) at least one type of fluorescent substance in a resin matrix (paragraph 39).

Cho does not specifically disclose the conversion layers includes at least one type of semiconductor ultrafine particles having a mean particle size of not more than 20 nm and the at least one type of fluorescent substance having a mean particle size of not less than 0.1 micron.

Okumura discloses a wavelength converter (figures 3 and 4) having two layers of conversion layers including a first wavelength conversion layer containing phosphors comprising ultrafine particles having a mean particle size less than 200 nm (column 7, lines 9-12), and a second wavelength conversion layer containing phosphors comprising a fluorescent substance having a mean particle more than 1 micron (column 8, lines 49-51), for the purpose of effectively emitting predetermined light.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have two layers of conversion layers including a first wavelength conversion layer containing phosphors comprising ultrafine particles having a mean particle size less than 200 nm, and a second wavelength conversion layer containing phosphors comprising a fluorescent substance having a mean particle more than 1 micron as disclosed by Okumura in the device disclosed by Cho, for the purpose of effectively emitting predetermined light.

Regarding claim 23, Okumura discloses the phosphors are dispersed in a resin (column 10, lines 13-40). The reason for combining is same as claim 22.

Regarding claim 24, Cho discloses the plurality of wavelength conversion layers are disposed so that peak wavelengths of light converted in each wavelength conversion layer can be progressively shorter from the light-emitting element side toward the outside (figures 5A and 5B, R, G, B).

Regarding claim 25, Cho in view of Maeda does not specifically disclose at least part of band gap energy of the phosphors is smaller than energy generated by the light-emitting element.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have at least part of band gap energy of the phosphors is smaller than energy generated by the light-emitting element in the device disclosed by Cho in view of Maeda, for the purpose of enhancing efficiency of the device.

Regarding claim 26, Cho discloses the wavelength converter (120) comprises at least three wavelength conversion layers and each light converted in the three wavelength conversion layers has a wavelength respectively corresponding to red, green and blue (figures 5A and 5B).

Regarding claim 27, Cho discloses each of the wavelength conversion layers is composed of a polymer resin thin film containing the phosphors (paragraph 33).

Regarding claim 28, Okumura discloses the ultrafine particles having a mean particle size of not more than 10 nm (column 4, lines 56-60). The reason for combining is same as claim 22.

Regarding claim 29, Cho in view of Okumura does not specifically disclose the wavelength conversion layers containing the semiconductor ultrafine particles are disposed on the light-emitting element side and a peak wavelength of output light from the semiconductor ultrafine particles is larger than a peak wavelength of output light from the fluorescent substance.

However, it is widely known different particle sizes converts lights into different wavelengths.[1] Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the wavelength conversion layers containing the semiconductor ultrafine particles are disposed on the light-emitting element side and a peak wavelength of output light from the semiconductor ultrafine particles is larger than a peak wavelength of output light from the fluorescent substance in the device disclosed by Cho in view of Okumura, for the purpose of controlling the output light wavelength by controlling the size of the particles.

Regarding claim 30, Okumura discloses the peak wavelength of output light from the ultrafine particles is 500 to 900 nm (column 5, lines 31-43). The reason for combining is same as claim 22.

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[1] At least Thurk (US 2004/0245912) and Bawndi (US 2003/0127660) disclose different particles sizes converts lights into different wavelengths; and that ultrafine particles are disposed on the light emitting element side.

Regarding claim 31, Cho discloses the peak wavelength of output light from the fluorescent substance is 400 to 700 nm (figures 5A and 5B, the fluorescent substance emits R, G, B). Also, Okumura discloses the peak wavelength output light from the fluorescent substance is 400 to 700 nm (column 9, line 35; column 12, line 23; and column 13, line 34). The reason for combining is same as claim 22.

Regarding claim 32, Cho discloses the excitation light has a center wavelength of not more than 450 nm (paragraph 4).

Regarding claim 33, Cho discloses the output light has a peak wavelength of 400 to 900 nm (figures 5A and 5B, the fluorescent substance emits R, G, B and outputs white light).

Regarding claim 34, Cho discloses the resin matrix is a substantially single resin layer (paragraph 39).

Regarding claims 35 and 36, Okumura discloses the thickness of wavelength converter being between 100 nm and 100 microns (column 6, lines 58-65). The reason for combining is same as claim 22.

Regarding claim 37, Cho further discloses having more than two phosphor layers (figure 5B). Cho in view of Okumura does not specifically disclose the layers having different ultrafine particles having different mean particle sizes. However, it is widely known different particle sizes converts lights into different wavelengths.[2] Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the wavelength conversion layers containing the semiconductor ultrafine particles are disposed on the light-emitting element side and a peak wavelength of output light from the semiconductor ultrafine particles is larger than a peak wavelength of output light from the fluorescent substance in the device disclosed by Cho in view of Okumura, for the purpose of controlling the output light wavelength by controlling the size of the particles.

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[2] At least Thurk (US 2004/0245912) and Bawndi (US 2003/0127660) disclose different particles sizes converts lights into different wavelengths; and that ultrafine particles are disposed on the light emitting element side.

Regarding claim 38, Cho discloses a light-emitting device (figures 5A and 5B) comprising a light-emitting element (110) that is provided on a substrate (105) and emits excitation light, and a wavelength converter that is positioned on an anterior surface of the light-emitting element and converts the excitation light into visible light (white light) wherein the visible light is output light, wherein the wavelength converter (figures 5A and 5B), comprising a plurality of wavelength conversion layers (120) at least one type of fluorescent substance in a polymer resin thin film (paragraph 39).

Cho does not specifically disclose the conversion layers includes at least one type of semiconductor ultrafine particles having a mean particle size of not more than 20 nm and the at least one type of fluorescent substance having a mean particle size of not less than 0.1 micron.

Okumura discloses a wavelength converter (figures 3 and 4) having two layers of conversion layers including a first wavelength conversion layer containing phosphors comprising ultrafine particles having a mean particle size less than 200 nm (column 7, lines 9-12), and a second wavelength conversion layer containing phosphors comprising a fluorescent substance having a mean particle more than 1 micron (column 8, lines 49-51), for the purpose of effectively emitting predetermined light.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have two layers of conversion layers including a first wavelength conversion layer containing phosphors comprising ultrafine particles having a mean particle size less than 200 nm, and a second wavelength conversion layer containing phosphors comprising a fluorescent substance having a mean particle more than 1 micron as disclosed by Okumura in the device disclosed by Cho, for the purpose of effectively emitting predetermined light.

Regarding claim 39, Cho discloses a method of producing a wavelength converter (figures 5A and 5B, 120) comprises the steps of: (a) dispersing at least one type of fluorescent substance (paragraph 39) in

an unhardened material of resin (paragraph 39); and (b) molding into sheet-like shape the resin (120, paragraph 39) having the fluorescent substance dispersed.

Cho does not specifically disclose dispersing at least one type of semiconductor ultrafine particles having a mean particle size of not more than 20 nm and at least one type of fluorescent substance having a mean particle size of not less than 0.1 microns in an unhardened material of resin, and dispersing the semiconductor ultrafine particles more on one principal surface side of the molded product, and the fluorescent substance more on the other principal surface side, and hardening the sheet after the semiconductor ultrafine particles and particles of the fluorescent substance are dispersed.

Okumura discloses a method of producing a wavelength converter (figures 3 and 4) having two layers of conversion layers including a first wavelength conversion layer containing phosphors comprising ultrafine particles having a mean particle size less than 200 nm (column 7, lines 9-12), and a second wavelength conversion layer containing phosphors comprising a fluorescent substance having a mean particle more than 1 micron (column 8, lines 49-51), for the purpose of effectively emitting predetermined light.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have two layers of conversion layers including a first wavelength conversion layer containing phosphors comprising ultrafine particles having a mean particle size less than 200 nm, and a second wavelength conversion layer containing phosphors comprising a fluorescent substance having a mean particle more than 1 micron as disclosed by Okumura in the method disclosed by Cho, for the purpose of effectively emitting predetermined light.

Cho in view of Maeda does not specifically disclose the particles and substance are dispersed in an unhardened material of resin and the material of resin is hardened after the particles and substance are

dispersed; and dispersing the semiconductor ultrafine particles more on one principal surface side of the molded product, and the fluorescent substance more on the other principal surface side.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the particles and substance are dispersed in an unhardened material of resin and the material of resin is hardened after the particles and substance are dispersed in the method disclosed by Cho in view of Maeda, for the purpose of effectively dispersing the particles and substance in the resin, and to have the semiconductor ultrafine particles more on one principal surface side of the molded product, and the fluorescent substance more on the other principal surface side in the method disclosed by Cho in view of Maeda due to the gravity difference between the relatively smaller particles and relatively larger substances.

Regarding claim 41, Cho discloses a method of producing a light-emitting device (figures 5A and 5B) comprising the steps of: providing a light-emitting element (110) on a substrate (105); and disposing the wavelength converter (120) according to claim 1 (note claim 1 rejection above) so as to cover the light-emitting element (110).

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cho in view of Okumura, in further view of Manabu.

Regarding claim 40, Cho in view of Okumura does not specifically disclose the step of synthesizing semiconductor ultrafine particles in a liquid phase and allowing silicone-based compounds in the liquid phase to coordinate, each of which is mainly composed of silicon-oxygen bonds and has a functional group selected from the group consisting of an amino group, a carboxyl group, a mercapto group and a hydroxy group, prior to the above-mentioned step (a) dispersing.

Manabu discloses a method of producing a wavelength converter (paragraph 1) including the step of synthesizing semiconductor ultrafine particles in a liquid phase (paragraph 31) and allowing silicone-based compounds in the liquid phase to coordinate (paragraph 14), each of which is mainly composed of silicon-oxygen bonds and has a functional group selected from the group consisting of an amino group, a carboxyl group, a mercapto group and a hydroxy group (paragraph 19), prior to the above-mentioned step (a) dispersing (paragraph 19), for the purpose of enhancing mechanical strength and chemical stability of the particles.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the step of synthesizing semiconductor ultrafine particles in a liquid phase and allowing silicone-based compounds in the liquid phase to coordinate, each of which is mainly composed of silicon-oxygen bonds and has a functional group selected from the group consisting of an amino group, a carboxyl group, a mercapto group and a hydroxy group, prior to the above-mentioned step (a) dispersing as disclosed by Manabu in the method disclosed by Cho in view of Okumura, for the purpose of enhancing mechanical strength and chemical stability of the particles.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakano (US 2003/0080341).

Regarding claim 1, Sakano discloses a wavelength converter (figures 1 and 10B) having two layers of conversion layers including a first wavelength conversion layer containing phosphors comprising ultrafine particles (82, paragraph 21), and a second wavelength conversion layer containing phosphors comprising a fluorescent substance having a mean particle size not less than 0.1 micron (81, paragraph 20).

Sakano does not specifically disclose the sizes of the ultrafine particles are in the range of not more than 20 nm.

However, one of ordinary skill in the art would have been led to the recited dimensions through routine experimentation and optimization. Applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical.

The examiner also notes that a phosphor particle size in the claimed range is widely known[3]; and, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a phosphor particle in the claimed size range in the device disclosed by Sakano, for the purpose of enhancing efficiency of the device.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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[3] At least Thurk (US 2004/0245912), Bawendi (US 2003/0127660), Okumura (US 5,811,924), and Ng (US 7,265,488 and US 2006/0066210) discloses using ultrafine phosphor particles for wavelength conversion material.

Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BUMSUK WON whose telephone number is (571)272-2713. The examiner can normally be reached on Monday through Friday, 8:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minh Toan Ton can be reached on 571-272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Bumsuk Won/
Primary Examiner, Art Unit 2889